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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/801,744	03/15/2004	Woo Young Lee	P/2292-89	1821

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EXAMINER

DICKEY, THOMAS L

ART UNIT PAPER NUMBER

2826

DATE MAILED: 02/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/801,744	Applicant(s) LEE ET AL.	
	Examiner Thomas L. Dickey	Art Unit 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 January 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) 14 and 15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4-9,11 and 13 is/are rejected.
- 7) ☒ Claim(s) 3,10 and 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1/27/05</u> . | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

Election/Restriction

1. Applicant's election of Group II, claims 1-13 in the Paper received 11/12/05 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Oath/Declaration

2. The oath/declaration filed on 01/02/98 is acceptable.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the two dimensional electron gas of claim 6, the Ohmic or Schottky contact resistance of claim 11, and the .5-2 nm Al_2O_3 or AlN insert of claim 12 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement-drawing sheet should include all of the figures appearing on the immediate

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prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the examiner does not accept the changes, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Priority

4. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Korea on 03/14/2003. It is noted, however, that applicant has not filed a certified copy of the Japanese application as required by 35 U.S.C. 119(b).

Information Disclosure Statement

5. The Information Disclosure Statement filed on 01/27/2005 has been considered.

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Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 4, line 2, the expression "such as" is indefinite because it recites a broad limitation and a narrow limitation within the broad limitation. Note that use of a narrower range within a broader range in the same claim renders the claim indefinite, since the resulting claims does not clearly set forth the metes and bounds of the patent protection desired.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

A. Claims 1,2,5,7 and 8 are rejected under 35 U.S.C. 102(b) as being anticipated by JIA ET AL. (IEEE Transactions, as cited by applicant on 1/27/05).

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Jia et al. discloses a hybrid ferromagnet/semiconductor spin device with a semiconductor (selected from Si, GaAs, InAs, and Ge) substrate; a source region formed on the substrate as a magnet metal ferromagnet selected from Fe, Co, Ni, FeCo, and NiFe, and thus having a great spin polarization; a spin channel region on the substrate, where a spin-polarized carrier at the source region is injected and transported; and a drain region formed on the substrate as a ferromagnet, for detecting a spin which has passed through the spin channel region, wherein one or the other of the source region and the drain region has a line width of a range of 5-1000 nm; and an interval between the source region and the drain region is in a range of 10 nm-1 micron. Note pages 4707-4708 of Jia et al.

B. Claims 1,2, and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by KAMIGUCHI ET AL. (5,962,905).

Kamiguchi et al. discloses a hybrid ferromagnet/semiconductor spin device with a semiconductor substrate 3; a source region 1 formed on the substrate 3 as a magnet metal ferromagnet selected from Fe, Co, Ni, FeCo, and NiFe, thus having a great spin polarization, or as CrO₂, a half metal having a spin polarization of 100%; a spin channel region 2 on the substrate 3, where a spin-polarized carrier at the source region 1 is injected and transported; and a drain region 5 formed on the substrate 3 as a ferromagnet, for detecting a spin which has passed through the spin channel region 2. Note figure 1, column 3 lines 3-30, and column 4 lines 24 and 30 of Kamiguchi et al.

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C. Claims 1,2,5,7, and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by HEIM ET AL. (5,465,185).

Heim et al. discloses a hybrid ferromagnet/semiconductor spin device with a semiconductor (selected from Si, GaAs, InAs, and Ge) substrate 61; a source region 63 having a line width of 7 nm (5-1000 nm) of formed on the substrate 61 as a magnet metal ferromagnet selected from Fe, Co, Ni, FeCo, and NiFe, and thus having a great spin polarization; a spin channel region 65 on the substrate 61, where a spin-polarized carrier at the source region 63 is injected and transported; and a drain region 70 having a line width of 5-1000 nm (6.5 nm, so that the source region 63 and the drain region have a different line width from each other with the result that a spin switching is anti-parallel in a certain magnet field range) formed on the substrate 61 as a ferromagnet, for detecting a spin which has passed through the spin channel region 65. Note figure 5, column 5 lines 5-30, and column 6 lines 52-54 of Heim et al.

D. Claims 1,2,6,11, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by JOHNSON (5,654,566).

With regard to claims 1,2,6, and 11 Johnson discloses a hybrid ferromagnet-semiconductor spin device with a semiconductor substrate 178-180; a source region 184 formed on the substrate 3 as a magnet metal ferromagnet selected from Fe, Co, Ni, FeCo, and NiFe, thus having a great spin polarization; an Ohmic contact resistance between the source region 184 ferromagnet and the semiconductor substrate 178-180; a compound semiconductor spin channel region 182 on the substrate 178-180, where a

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spin-polarized carrier at the source region 184 is injected and transported; and a drain region 186 formed on the substrate 178-180 as a ferromagnet, for detecting a spin which has passed through the spin channel region 182. Note figure 2 and column 5 lines 6-36 of Johnson.

With regard to claims 13 Johnson discloses a spin-polarized field effect transistor with a gate 174, an insulating layer 176 formed under the gate 174, a source region 184 and a drain region 186 formed at left and right sides of the insulating layer 176 by using a ferromagnet, and a two dimensional electron gas 182 below the insulating layer 176, wherein a precession of a spin-polarized carrier is controlled by a voltage 172 applied to the gate 174. Note figure 2 and column 5 lines 6-36 of Johnson.

Allowable Subject Matter

8. Claim 3,10 and 12 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

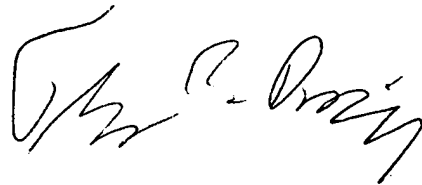
Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas L Dickey whose telephone number is 571-272-1913. The examiner can normally be reached on Monday-Thursday 8-6.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Thomas L. Dickey', is positioned above the printed name.

Thomas L. Dickey
Patent Examiner
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12/04